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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,157	04/08/2004	Dong-woo Lee	249/459	7040

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3141 FAIRVIEW PARK DRIVE
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FALLS CHURCH, VA 22042

EXAMINER

FORD, JOHN K

ART UNIT	PAPER NUMBER
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3744

MAIL DATE	DELIVERY MODE
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05/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/820,157	LEE ET AL.	
	Examiner	Art Unit	
	John K. Ford	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on April 12, 2007
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) 6, 8, 14, 15, 17 & 18 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-13 is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, 10, 16, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Applicant's response of April 12, 2007 has been studied carefully. No amendments have been made to any of the claims, therefore it has been treated as a request to reconsider the previously set forth rejections in the office action of December 12, 2006.

The only substantive argument, articulated on page 8 of the April 12, 2007 response, appears to be that the teachings of JP '293 and Bandoh cannot be combined.

Contrary to applicant's mistaken premise behind this argument, JP '293 is not limited to cooling only. JP '293 has a ceramic heater 24 between the wafer W and the cooling surface of evaporator 40A. The heater 24 of JP '293 is in the same position (i.e. between the wafer and the cooling fluid cavity of evaporator 40A) as the heaters designated 21A, 23A, 25A and 27A in Bandoh, which are between the wafer and the cooling fluid cavity 9. Additionally, Bandoh teaches heaters 21B, 23B, 25B and 27B disposed symmetrically below the cooling cavity 9 for the advantageous purpose creating symmetry in the heating of the platen and wafer. While not specifically discussed, such symmetry in heating would increase uniformity of temperature in the upper and lower portions advantageously preventing any thermally induced deformation of the wafer platen caused by asymmetric heating of the upper and lower surfaces (such asymmetric heating being disclosed in JP '293). Both heaters in Bandoh serve a clear and beneficial purpose of symmetrical heating, notwithstanding applicant's remarks to the contrary.

Applicant makes no more than a passing reference to Shosinger or JP '080, thereby conceding to what the examiner has cited them to show and teach. Similarly, applicant concedes that JP '049 and JP '080 properly teach what they were cited to show and teach by failing to articulate any argument apart from the above argument relating to the alleged "no purpose served" argument relating to JP '293/Bandoh.

Applicant's arguments are completely unconvincing and fail to rise to that evidencing a minimal level of skill in this art.

The previous office action of December 12, 2006 is incorporated by reference here, must be read in conjunction with the above comments and is attached to this office action for convenience.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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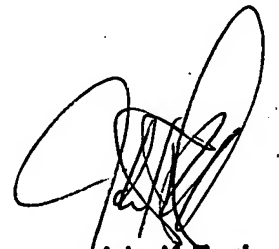
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John K. Ford whose telephone number is 571-272-4911.

The examiner can normally be reached on Mon.-Fri. 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



John K. Ford
Primary Examiner

Appendix

copy of office activity
of December 12, 2006

Applicant's responses of September 22, 2006 and August 22, 2006 have been studied carefully. New rejections necessitated as a consequence of amendments made to claim 1 are presented here.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 9, 10, 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293), Bandoh et al (USP 6,626,236) and Shlosinger (USP 3,543,839) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes and no heaters are shown along the bottom surface of the heat pipe (40A).

Bandoh in Figure 2 discloses a substrate heater that has a top surface of a plate body 3 for receiving a wafer 29 to be baked that includes a first set of heaters 21A, 23A, 25A and 27A (analogous to heater 24 of Kimono), a cooling chamber 9 is formed in the plate body 3 (analogous to the evaporator chamber of Kimono). Importantly, a second

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set of heaters comprised of elements 21B, 23B, 25B and 27B extends along the bottom surface of the plate body 3. Such sets of upper and lower heaters advantageously form "a vertically symmetrical heating balance" in the heat exchange plate 1 of Bandoh.

To have added a second set of heaters to bottom outer lower surface of heat pipe 40A of Komino (in the manner taught by Bandoh) would have been obvious to one of ordinary skill in the art as taught by Bandoh to advantageously form "a vertically symmetrical heating balance" in the heat pipe 40A of Kimono.

Shlosinger teaches in a heat pipe structure identical to the one shown in Figure 5 of Komino, the advantage of using a valve (26 or 78) in the connection pipe between the evaporator section (corresponding to 40A of Komino) and the condenser section (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe.

To have used a valve in Komino, in the connection pipe (124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Shlosinger. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by both Komino (the entire document) and Shlosinger (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 4, 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art as applied to claim 3 above, and further in view of JP 2-126049.

JP '049 teaches two valves 16 and 17 in the respective connection pipes between the evaporator and condenser of a loop-type heat pipe such as shown in Komino. Such a set of two valves would more positively cut-off undesirable flow between the evaporator and condenser than would the single valve of Shlosinger and would have been obvious to have used in Komino to take advantage of that improved ability to cut-off flow. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Claims 1, 2, 3, 4, 5, 9, 10, 16, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293), Bandoh et al (USP 6,626,236) and Kawai (JP 5-99580) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes and no heaters are shown along the bottom surface of the heat pipe (40A).

Bandoh in Figure 2 discloses a substrate heater that has a top surface of a plate body 3 for receiving a wafer 29 to be baked that includes a first set of heaters 21A, 23A, 25A and 27A (analogous to heater 24 of Kimono), a cooling chamber 9 is formed in the plate body 3 (analogous to the evaporator chamber of Kimono). Importantly, a second set of heaters comprised of elements 21B, 23B, 25B and 27B extends along the bottom surface of the plate body 3. Such sets of upper and lower heaters advantageously form "a vertically symmetrical heating balance" in the heat exchange plate 1 of Bandoh.

To have added a second set of heaters to bottom outer lower surface of heat pipe 40A of Komino (in the manner taught by Bandoh) would have been obvious to one of ordinary skill in the art as taught by Bandoh to advantageously form "a vertically symmetrical heating balance" in the heat pipe 40A of Kimono.

Kawai in Figure 7 teaches, in a heat pipe structure identical to the one shown in Figure 5 of Komino, using two check valves (7), one in each of the connection pipes between the evaporator section 4 (corresponding to 40A of Komino) and the condenser section 5 (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe by ensuring circulation in only one direction (i.e. no reverse flow).

To have used two such check valves in Komino, one in each of the connection pipes (122 and 124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Kawai. Such a modification would, for example, advantageously prevent the device from starting up with the working fluid flowing in the wrong direction.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by Komino (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 11-13 are allowed.

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John K. Ford
Primary Examiner